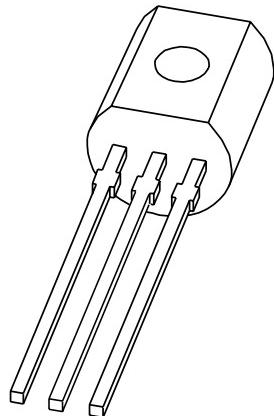


DATA SHEET



PBSS4140S
40 V low V_{CEsat} NPN transistor

Product specification

2001 Nov 27

40 V low V_{CEsat} NPN transistor**PBSS4140S****FEATURES**

- High power dissipation (830 mW)
- Ultra low collector-emitter saturation voltage
- 1 A continuous current
- High current switching
- Improved device reliability due to reduced heat generation.

APPLICATIONS

- Medium power switching and muting
- Linear regulators
- DC/DC converter
- LCD back-lighting
- Supply line switching circuits
- Battery driven equipment (mobile phones, video cameras and hand-held devices).

DESCRIPTION

NPN low V_{CEsat} transistor in a SOT54 plastic package.
PNP complement: PBSS5140S.

MARKING

TYPE NUMBER	MARKING CODE
PBSS4140S	S4140S

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{CEO}	collector-emitter voltage	40	V
I_C	collector current (DC)	1	A
I_{CM}	peak collector current	2	A
R_{CEsat}	equivalent on-resistance	<500	$m\Omega$

PINNING

PIN	DESCRIPTION
1	base
2	collector
3	emitter

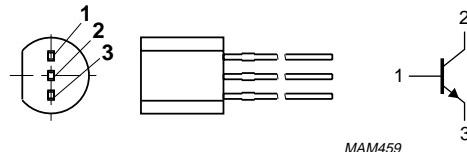


Fig.1 Simplified outline (SOT54) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	40	V
V_{CEO}	collector-emitter voltage	open base	–	40	V
V_{EBO}	emitter-base voltage	open collector	–	5	V
I_C	collector current (DC)		–	1	A
I_{CM}	peak collector current		–	2	A
I_{BM}	peak base current		–	1	A
P_{tot}	total power dissipation	$T_{amb} \leq 25^\circ C$; note 1	–	830	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated and standard footprint.

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air; note 1	150	K/W

Note

1. Device mounted on a printed-circuit board, single-sided copper, tinplated and standard footprint.

CHARACTERISTICS $T_{amb} = 25^\circ C$ unless otherwise specified.

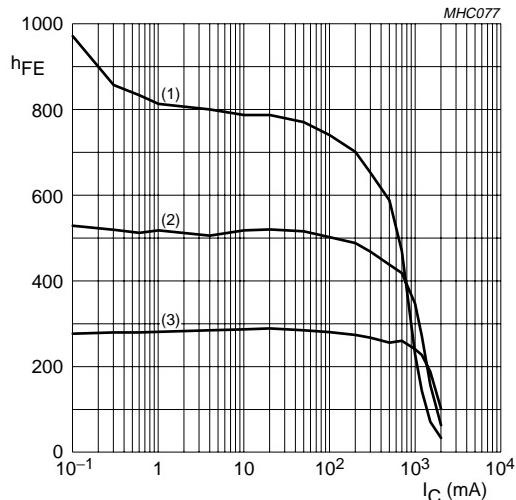
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	$V_{CB} = 40\text{ V}; I_C = 0$	—	—	100	nA
		$V_{CB} = 40\text{ V}; I_C = 0; T_{amb} = 150^\circ C$	—	—	50	μA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30\text{ V}; I_B = 0$	—	—	100	nA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0$	—	—	100	nA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 1\text{ mA}$	300	—	—	
		$V_{CE} = 5\text{ V}; I_C = 500\text{ mA}$	300	—	900	
		$V_{CE} = 5\text{ V}; I_C = 1\text{ A}$	200	—	—	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 1\text{ mA}$	—	—	200	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	—	—	250	mV
		$I_C = 1\text{ A}; I_B = 100\text{ mA}$	—	—	500	mV
R_{CEsat}	equivalent on-resistance	$I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$	—	260	<500	$m\Omega$
V_{BEsat}	base-emitter saturation voltage	$I_C = 1\text{ A}; I_B = 100\text{ mA}$	—	—	1.2	V
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = 5\text{ V}; I_C = 1\text{ A}$	—	—	1.1	V
f_T	transition frequency	$I_C = 50\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$	150	—	—	MHz
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_e = 0; f = 1\text{ MHz}$	—	—	10	pF

Note

1. Pulse test: $t_p \leq 300\text{ }\mu s$; $\delta \leq 0.02$.

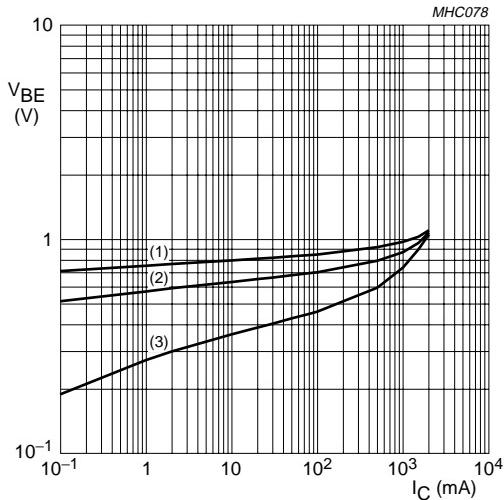
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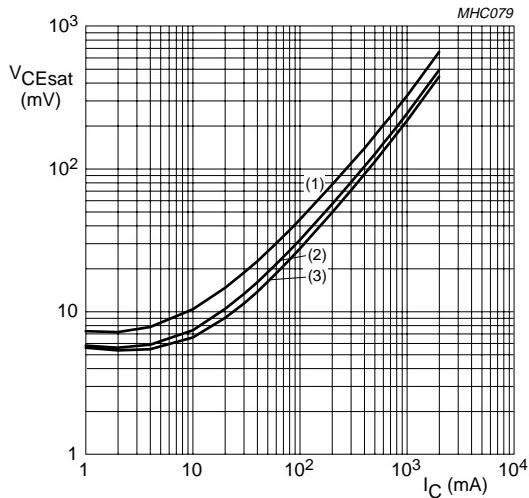
$V_{CE} = 5\text{ V}$.
 (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$.
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.
 (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

Fig.2 DC current gain as a function of collector current; typical values.



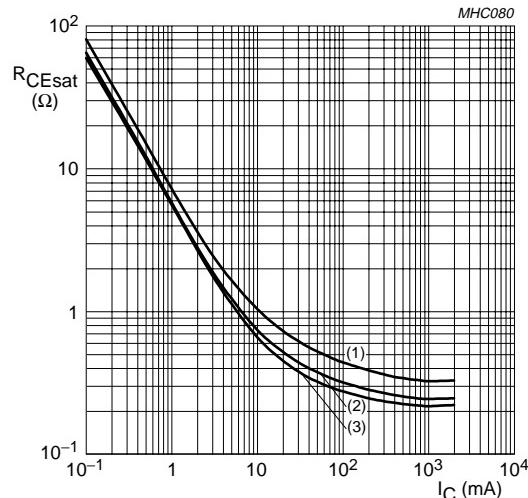
$V_{CE} = 5\text{ V}$.
 (1) $T_{amb} = -55\text{ }^{\circ}\text{C}$.
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.
 (3) $T_{amb} = 150\text{ }^{\circ}\text{C}$.

Fig.3 Base-emitter voltage as a function of collector current; typical values.



$I_C/I_B = 10$.
 (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$.
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.
 (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

Fig.4 Collector-emitter saturation voltage as a function of collector current; typical values.



$I_C/I_B = 10$.
 (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$.
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.
 (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

Fig.5 Equivalent on-resistance as a function of collector current; typical values.

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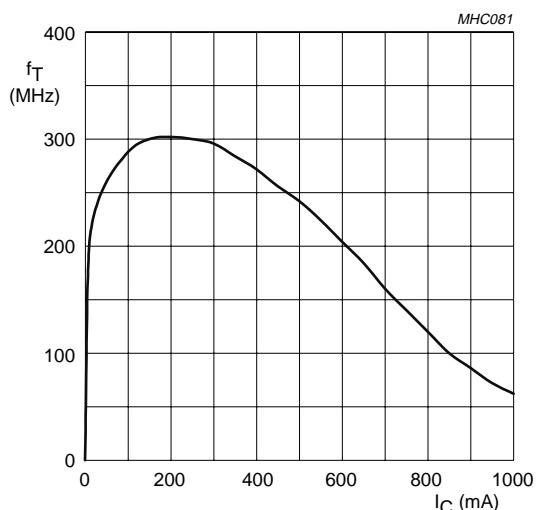
 $V_{CE} = 10$ V.

Fig.6 Transition frequency as a function of collector current.

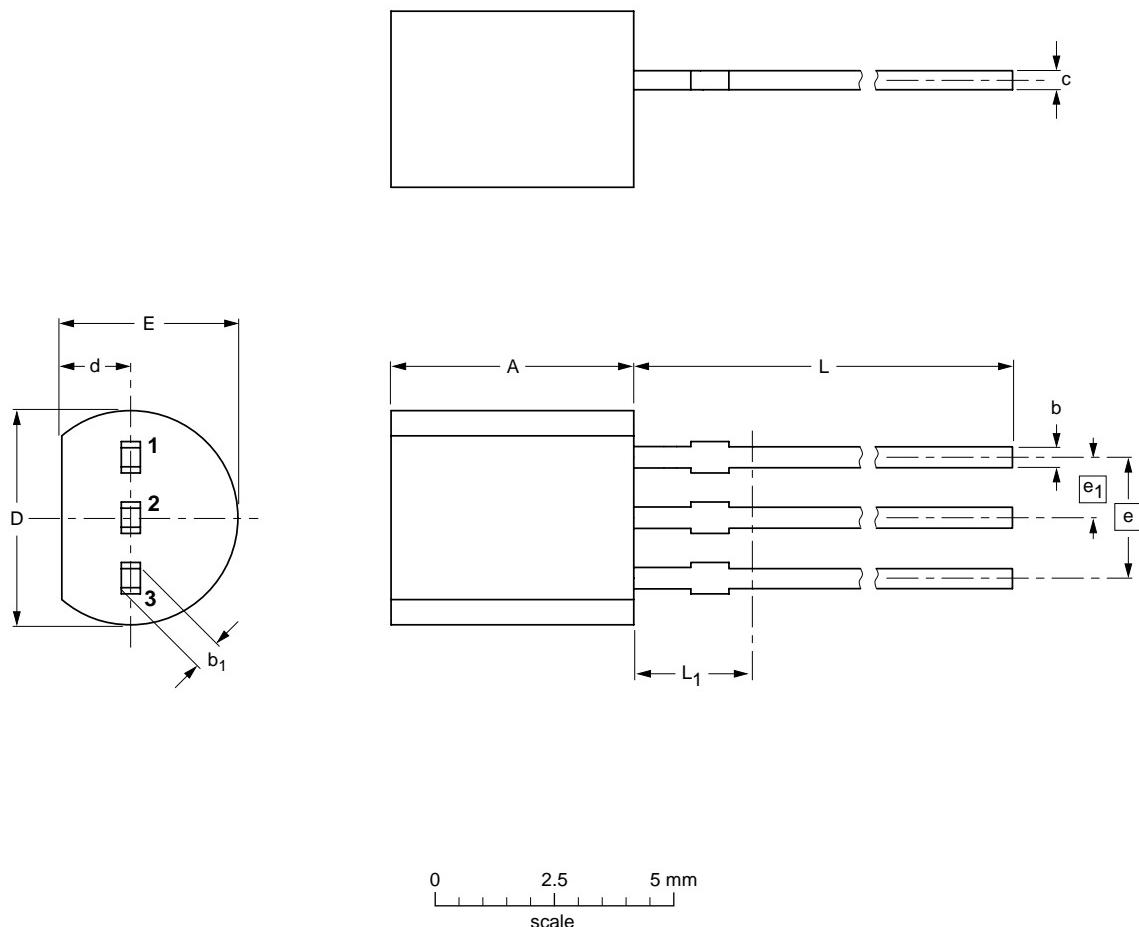
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PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads

SOT54



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	$L_1^{(1)}$
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT54		TO-92	SC-43			97-02-28

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Contact information

For additional information please visit <http://www.semiconductors.philips.com>. Fax: +31 40 27 24825
For sales offices addresses send e-mail to: sales.addresses@www.semiconductors.philips.com.

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